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EXAMINER	
TRAN, CON P	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,937	CHENEY ET AL.	
	Examiner	Art Unit	
	CON P. TRAN	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/06/09 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-17, 21, and 30-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitecar et al. U.S. Patent 5,815,584 (hereinafter, "Whitecar") in view of Porambo et al. U.S. Patent 5,450,624 (hereinafter, "Porambo").

Regarding **claim 1**, Whitecar teaches a method (see Figs. 1, 2, 3, and respective portions of the specification; col. 1, lines 34-49), comprising:

driving an amplifier (power amplifiers 11, 14, Fig. 1) *in a predefined manner* (using tone, step 60, Fig. 3; col. 4, lines 36-43),

sensing a change in power (by clipping detector threshold 51, Fig. 2; col. 3, lines 3-9) *delivered to a power input* (V^+) *of the amplifier* (11, 14, Fig. 1; when clipping the clip detector pulls supply voltage at resistor 24 to ground, or when not clipping the junction is at a high voltage, i.e., power input to the amplifier; see col. 2, lines 41-52) *as a result of the predefined driving* (by amplifying; col. 4, lines 36-43), *and*

determining a value indicative (output voltage of each power stage, col. 3, lines 63-67; predetermined safe-operating-area; col. 1, lines 60-64) *of* which of *speaker or speakers are connected* (detecting improper connection of speakers, col. 1, lines 38-41) *to an output of the amplifier, based on the sensed change in power* (clipping, col. 4, lines 36-43; when amplifier is unmated, the output voltage of each power stage should be equal to the DC bias voltage of the power amplifier, see col. 3, lines 54-67). It is noted that although clippings occur at the amplifier output, sensing a change in power occurs at input of amplifier (i.e., supply voltage; see col. 2, lines 41-52).

Whitecar discloses identifying which speaker is inoperative (col. 6, lines 24-26).

However, Whitecar does not explicitly disclose *which type* of speaker or speakers are connected to an output of the amplifier, based on the sensed change in power.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within

the system itself (col. 2, lines 59-63). If the clipping threshold detected occurs at a level of signal (70) which is within a predetermined range corresponding to an acceptable or normal impedance range (90) as shown in FIG. 4, it will be understood that the conductors (76 and 78) form a complete circuit between the amplifier and the speaker terminals on speaker (80). The acceptable range is dependent upon the variable impedance which may be presented by one or more speakers 80 (for example, the left front 16, left rear 18, right front 20 and right rear 22; see col. 5, lines 24-37), i.e., type of speaker depending on impedance.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that determining a value indicative of *which type* of speaker or speakers are connected to an output of the amplifier, based on the sensed change in power as claimed for purpose of not being requiring the disassembly or reconnection of testing apparatus, as suggested by Porambo in column 2, lines 18-20.

Regarding **claim 2**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which sensing the change in power comprises sensing a change in power (i.e., clipping) delivered to a power input (V^+) of an apparatus that includes the amplifier (11, 14, Fig. 1) as a result of the predefined driving (by amplifying the low level tone; col. 4, lines 36-43).

Regarding **claim 3**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which sensing the change in power comprises sensing a change in power (i.e., clipping) transmitted from a power supply (i.e., battery) supplying the amplifier (11, 14, Fig. 1) as a result of the predefined driving (col. 1, lines 48-54).

Regarding **claim 4**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which sensing the change in power comprises measuring a current (current sink; col. 2, lines 46-52).

Regarding **claim 5**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which determining the value comprises:

comparing the sensed change to a plurality of stored changes (current sink when clipping occur, or when clipping not occur; col. 2, lines 41-57), each stored change corresponding to an identified one of the one or more speakers (see steps 56, 57, 62, 63, 65, 66 speaker short is detected, Fig. 3; Fig. 3, col. 5, lines 9-18); and

selecting a stored change closest to the sensed change (see flow chart, Fig. 3; col. 4, line 65 - col. 5, line 18).

Regarding **claim 6**, Whitecar teaches the method of claim 1 in which driving the amplifier in a predefined manner comprises applying a tone signal as driving signal of known amplitude to the amplifier (low level tone, col. 4, lines 36-43). However, Whitecar does not explicitly disclose the driving signal having a known frequency.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which a DSP generator would generate a generally inaudible tone, that is, a tone in a frequency range to which the human ear is less sensitive e.g. 19 KHz, so that the operator would not be annoyed by the tone during the test procedure (col. 2, lines 52-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that the tone signal being the driving signal of known frequency as claimed for purpose of not being annoyed by the tone during the test procedure, as suggested by Porambo in column 2, lines 55-57.

Regarding **claim 7**, Whitecar teaches the method of claim 1. However, Whitecar does not explicitly disclose in which driving the amplifier in a predefined manner comprises applying a driving signal with characteristics which prevent the amplifier output from causing an audible effect.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which a DSP generator would generate a generally inaudible tone, that is, a tone in a frequency range to which the human ear is less sensitive e.g. 19 KHz, i.e., characteristics which prevent the amplifier output from causing an audible effect so that the operator would not be annoyed by the tone during the test procedure (col. 2, lines 52-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that driving the amplifier in a predefined manner as claimed for purpose of not being annoyed by the tone during the test procedure, as suggested by Porambo in column 2, lines 55-57.

Regarding **claim 8**, Whitecar teaches the method of claim 1. However, Whitecar does not explicitly disclose in which determining a value comprises determining an impedance seen at the output of the amplifier.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which determining a value comprises determining an impedance seen at the output of the amplifier (i.e., predetermined range corresponding to an acceptable or normal impedance range 90 as shown in Fig. 4; see col. 5, lines 24-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that driving the amplifier in a predefined manner as claimed for purpose of not being annoyed by the tone during the test procedure, as suggested by Porambo in column 2, lines 55-57.

Regarding **claim 9**, Whitecar teaches the method of claim 1. However, Whitecar does not explicitly disclose method of claim 1 also including comparing the determined value to an expected value for the one or more speakers.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which including comparing the determined value to an expected value for the one or more speakers (i.e., if the clipping threshold detected occurs at a level of signal 70 which is within predetermined range corresponding to an acceptable or normal impedance range 90 as shown in Fig. 4; see col. 5, lines 24-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that including comparing the determined value to an expected value for the one or more speakers as claimed for purpose of not being annoyed by the tone during the test procedure, as suggested by Porambo in column 2, lines 55-57.

Regarding **claim 10**, Whitecar in view of Porambo teaches the method of claim 9. Whitecar, as modified, further teaches in which the expected value comprises an impedance of the one or more speakers (normal impedance range 90 as shown in Fig. 4; see col. 5, lines 24-36).

Regarding **claim 11**, Whitecar in view of Porambo teaches the method of claim 9. Whitecar, as modified, further teaches in which the expected value comprises an impedance of the one or more speakers operating at a frequency of a signal driving the amplifier (19 KHz; col. 2, lines 52-57).

Regarding **claim 12**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which the identification includes an identification of two speakers (12-13, 15-16, Fig. 1; speaker short is detected, see step 66, Fig. 3, col. 5, lines 9-15) connected to the output of the amplifier (11, 14, Fig. 1; col. 2, lines 23-27).

Regarding **claim 13**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which driving the amplifier in a predefined manner comprises applying at least one probing signal (low level tone; col. 4, lines 36-43).

Regarding **claim 14**, Whitecar teaches the method of claim 13. Whitecar further teaches in which two speakers are connected to the channel (OUT C and OUT D are differentially connected to drive the speaker of the other stereo channel; col. 2, line 65 – col. 3, line 2. However, Whitecar does not explicitly disclose method in which more than one probing signal is used to drive the amplifier.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which more than one probing signal is used to drive the amplifier (i.e., varying the level of said tone signal throughout the predetermined range of operating values; col. 3, lines 2-6; varying level of said tone signal throughout the predetermined range of operating values; col. 8, lines 20-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that more than one probing signal is used to drive the amplifier as claimed for purpose of without increasing packaging space required for the system, as suggested by Porambo in column 2, lines 62-63.

Regarding **claim 15**, Whitecar teaches the method of claim 13. However, Whitecar does not explicitly disclose in which the probing signal is selected to be outside a normal range of hearing.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which the probing signal is selected to be outside a normal range of hearing (DSP generator would generate a generally inaudible tone, that is, a tone in a frequency range to which the human ear is less sensitive e.g. 19 KHz, i.e., characteristics which prevent the amplifier output from causing an audible effect so that the operator would not be annoyed by the tone during the test procedure (col. 2, lines 52-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that driving the amplifier in a predefined manner as claimed for purpose of not being annoyed by the tone during the test procedure, as suggested by Porambo in column 2, lines 55-57.

Regarding **claim 16**, Whitecar in view of Porambo teaches the method of claim 13. Whitecar, as modified, further teaches in which the probing signal is a single pulse comprising a shape that is selected to minimize an audible effect of energizing a drive coil of a DC-connected speaker (a pulse width modulated signal with (pulse width modulated waveform with a high logic level for 40 microseconds and a low logic level for 20 milliseconds; col. 4, lines 55-59).

Regarding **claim 17**, Whitecar in view of Porambo teaches the method of claim 1. Whitecar, as modified, further teaches in which the change comprises an input supply current change of the amplifier (when clipping occurs, current sink change the input of the amplifier (col. 2, lines 41-52; col. 4, lines 36-43).

Regarding **claim 21**, Whitecar teaches a system (see Figs. 1, 2, 3, and respective portions of the specification; col. 1, lines 34-49) comprising:

an amplifier (power amplifiers 11, 14, Fig. 1) *having a speaker output* (12-13, 15-16, Fig. 1), *a drive signal input* (Left, Right inputs, Fig. 1), *and a power input* (V^+; Fig. 1; col. 2, lines 41-52), *and*

a circuit (clip detector, col. 2, lines 41-57; clipping detector threshold 51, Fig. 2; col. 3, lines 3-9) *connected to sense a change in power to delivered to the power input as a result of an input signal on the drive signal input* (when clipping the clip detector pulls supply voltage at resistor 24 to ground, or when not clipping the junction is at a high voltage from power supply +V, i.e., power input to the amplifier; see col. 2, lines 41-52), *and*

determine a value (output voltage of each power stage, col. 3, lines 63-67; predetermined safe-operating-area; col. 1, lines 60-64) *indicative* (output voltage of each power stage, col. 3, lines 63-67; predetermined safe-operating-area; col. 1, lines 60-64) *of* which of *speaker or speakers are connected to the speaker output* (detecting improper connection of speakers, col. 1, lines 38-41; speakers 12-13, 15-16, Fig. 1) *based on the sensed change in power being drawn at the power input* (provide a current

sink i.e., a direct connection to ground when clipping occurs, col. 4, lines 36-43; when amplifier is unmuted the output voltage of each power stage should be equal to the DC bias voltage of the power amplifier, see col. 3, lines 54-67). Thus, the occurrence of clipping pulls the voltage at resistor 24 to ground, whereas the junction is at a high voltage from voltage supply +V when clipping is not occurring; col. 2, lines 41-57).

However, Whitecar does not explicitly disclose *which type* of speaker or speakers are connected to the speaker output based on the sensed change in power being drawn at the power input.

Porambo discloses a method and apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63). If the clipping threshold detected occurs at a level of signal (70) which is within a predetermined range corresponding to an acceptable or normal impedance range (90) as shown in FIG. 4, it will be understood that the conductors (76 and 78) form a complete circuit between the amplifier and the speaker terminals on speaker (80). The acceptable range is dependent upon the variable impedance which may be presented by one or more speakers 80 (for example, the left front 16, left rear 18, right front 20 and right rear 22; see col. 5, lines 24-37), i.e., type of speaker depending on impedance.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the method and apparatus for diagnosing radio circuit conditions taught by Porambo with the method of Whitecar such that determining a value indicative of *which type* of speaker or speakers are connected to

the speaker output based on the sensed change in power being drawn at the power input as claimed for purpose of not being requiring the disassembly or reconnection of testing apparatus, as suggested by Porambo in column 2, lines 18-20.

Regarding **claim 30**, this claim merely specifies a program necessary for performing to method claim of claim 1 and is therefore interpreted and rejected for the same reasons.

Regarding **claim 31**, this claim merely specifies a program necessary for performing to method claim of claim 6 and is therefore interpreted and rejected for the same reasons.

Regarding **claim 32**, this claim merely specifies a program necessary for performing to method claim of claim 11 and is therefore interpreted and rejected for the same reasons.

4. **Claims 18, and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitecar et al. U.S. Patent 5,815,584 (hereinafter, "Whitecar") in view of Porambo et al. U.S. Patent 5,450,624 (hereinafter, "Porambo") and further in view of Granata et al. U.S. Patent 3,609,562 (hereinafter, "Granata").

Regarding **claim 18**, Whitecar in view of Porambo teaches the method of claim 1. However, Whitecar in view of Porambo does not explicitly disclose in which determining the value comprises performing noise rejection.

Granata discloses a demodulator which is synchronized to the incoming signal for the purpose of detecting part of the incoming signals (col. 1, lines 18-20). Granata further discloses witch S1 (Fig. 1), when placed in the position such that AND (13 and 14) and inverters (11 and 12) are incorporated into the demodulator, provides the system with a noise-rejection means (see Fig. 1, col. 3, lines 46-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the synchronized demodulator having noise-rejection means taught by Granata with the method of Whitecar in view of Porambo such that determining the value comprises performing noise rejection as claimed since the claimed invention is merely a combination of old elements, and in the combination each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable. In addition, the motivation is improve the accuracy of the demodulator, as suggested by Granata in col. 2, lines 20-22.

Regarding **claim 19**, Whitecar in view of Porambo and further in view of Granata teaches the method of claim 18. Granata, as modified, further teaches in which performing noise rejection comprises performing noise rejection using synchronized demodulation (see Fig. 2B, col. 3, lines 46-57).

5. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Whitecar et al. U.S. Patent 5,815,584 (hereinafter, "Whitecar") in view of Porambo et al. U.S. Patent 5,450,624 (hereinafter, "Porambo") in view of Granata et al. U.S. Patent 3,609,562 (hereinafter, "Granata") and further in view of Losher U.S. Patent 3,045,180.

Regarding **claim 20**, Whitecar in view of Porambo in view of Granata teaches the method of claim 18. However, Whitecar in view of Porambo in view of Granata does not explicitly disclose performing noise rejection comprises performing noise rejection using correlation analysis.

Losher discloses analyzing low-frequency repetitive complex wave signals (col. 1, lines 8-10) including a correlation analysis (col. 1, lines 32-38) in which providing noise rejection capabilities (col. 3, lines 57-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the correlation analysis taught by Losher with the method of Whitecar, Porambo, Granata in combination such that performing noise rejection comprises performing noise rejection using correlation analysis as claimed since the claimed invention is merely a combination of old elements, and in the combination each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable. In addition, the motivation is being possible to detect

synchronous signals in wave signals even if deeply submerged in noise, as suggested by Losher in col. 3, lines 70-73.

6. **Claims 21-25, 27-28, 30, and 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto U.S. Patent 4,752,959, cited by Applicants in view of Porambo et al. U.S. Patent 5,450,624 (hereinafter, "Porambo").

Regarding **claim 21**, Matsumoto teaches a system (wiring state detecting device see Figs. 1, 2, 3, 4, 5 and respective portions of the specification; col. 1, lines 29-33; col. 2, lines 61 - col. 3, lines 27) comprising:

an amplifier (stereo unit 3, Fig. 3; col. 2, lines 61-65) *having a speaker output* (output of stereo unit 3 to speaker 5, Fig. 3), *a drive signal input* (input at output stage of stereo unit 3, Fig. 3; col. 3, lines 10-14), *and a power input* (power supply line P, Fig. 3; col. 3, lines 1-3), and

a circuit (wiring state detecting circuit 31, Fig. 3; col. 2, lines 61-65) *connected to sense a change in power to delivered to the power input (V_{DD}, Fig. 3 via relay 311, Fig. 3), and*

determine a value indicative of a speaker or speakers (5, Fig. 3) *are connected to the speaker output* (output of stereo unit 3 to speaker 5, Fig. 3) *based on the sensed change in power being drawn at the power input* (steps 205-210, Fig. 5; col. 3, lines 50 – col. 4, line 10).

However, Matsumoto does not explicitly discloses: determine which type of speaker or speakers are connected to the speaker output; the circuit connected to sense a change in power to delivered to the power input as a result of an input signal on the drive signal input.

Porambo discloses an apparatus for diagnosing radio circuit conditions such as the electrical connection between an amplifier and speaker within the system itself (col. 2, lines 59-63) in which a digital signal processor includes a generator for generating an input signal at a predetermined level to the amplifier, a clip detector detecting if signal clipping in the amplifier (col. 2, lines 26-31); if clipping occurs at an input signal amplitude below a predetermined level, a short circuit condition is identified by the DSP; similarly, a detection of a clipping threshold at an input voltage amplitude greater than a predetermined level will indicate an open circuit condition between the amplifier and the speaker (col. 2, lines 35-40); If the clipping threshold detected occurs at a level of signal (70) which is within a predetermined range corresponding to an acceptable or normal impedance range (90) as shown in FIG. 4, it will be understood that the conductors (76 and 78) form a complete circuit between the amplifier and the speaker terminals on speaker (80). The acceptable range is dependent upon the variable impedance which may be presented by one or more speakers 80 (for example, the left front 16, left rear 18, right front 20 and right rear 22; see col. 5, lines 24-37), i.e., type of speaker depending on impedance.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the apparatus for diagnosing radio circuit

conditions taught by Porambo with the system of Matsumoto such that determine which type of speaker or speakers are connected to the speaker output; the circuit connected to sense a change in power to delivered to the power input as a result of an input signal on the drive signal input as claimed in order to determine the status of the amplifier output, without requiring the disassembly or reconnection of testing apparatus to the installed communication system, as suggested by Porambo in column 2, lines 17-21.

Regarding **claim 22**, Matsumoto in view of Porambo teaches the system of claim 21. Matsumoto, as modified, teaches also including a current supply electrically connected to the power input of the amplifier (at power supply line P; col. 2, lines 28-35).

Regarding **claim 23**, Matsumoto in view of Porambo teaches the system of claim 22. Matsumoto, as modified, teaches in which the circuit comprises an inductor (i.e., coil of the relay 311, Fig. 3; col. 4-6) across which a voltage measurement can be made, the inductor being electrically connected (via CPU 314, power supply command circuit 315, see Fig. 3) between the current supply and the power input of the amplifier (col. 3, lines 3-17).

Regarding **claim 24**, Matsumoto in view of Porambo teaches the system of claim 23. However, Matsumoto in view of Porambo does not explicitly disclose in which the inductor comprises a low resistance portion and a low inductance portion. Since coil

comprising resistance portion and induction portion; and coil of the relay (311, Fig. 3) is connected to the computer (314, Fig. 3) so that the relay (311) is operated by the output signal of the computer (314).

Therefore, it would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made, to pick a low value resistance and a low value impedance in wiring state detecting circuit (31, Fig. 3) since there are a finite number of identified, predictable potential solutions (i.e. low, high, medium) to the recognized need (i.e., operated by the output signal of the computer) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success.

Regarding **claim 25**, Matsumoto in view of Porambo teaches the system of claim 22. Matsumoto, as modified, teaches in which the circuit comprises a resistive circuit board trace (relay 311, Fig. 3) with two points between which a voltage drop can be measured (at node together with A/D 312, Fig. 3), the resistive circuit board trace being electrically connected between the current supply (at P, see Fig. 3) and the power input of the amplifier (stereo unit 3, Fig. 3).

Regarding **claim 27**, Matsumoto in view of further Porambo teaches the system of claim 21. Matsumoto, as modified, teaches in which the circuit (wiring state detecting circuit 31, Fig. 3; col. 2, lines 61-65) detects the amount of power being drawn at the power input of the amplifier by sensing an amount of power transmitted from a power

supply electrically connected to the power input of the amplifier (steps 205-210, Fig. 5; col. 3, lines 50 – col. 4, line 10).

Regarding **claim 28**, Matsumoto in view of Porambo teaches the system of claim 21. Matsumoto, as modified, teaches further comprising:

an apparatus including the amplifier (stereo unit 3, Fig. 3; col. 2, lines 61-65),

wherein the circuit detects the amount of power being drawn at the power input of the amplifier by sensing an amount of power drawn at a power input of the apparatus (steps 205-210, Fig. 5; col. 3, lines 50 – col. 4, line 10).

Regarding **claim 30**, this claim merely specifies a program necessary for operating to apparatus claim of claim 21 and is therefore interpreted and rejected for the same reasons.

Regarding **claim 38**, this claim has similar limitations as Claim and is therefore interpreted and rejected for the same reasons.

7. **Claims 26, 29 and 33-37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto U.S. Patent 4,752,959, cited by Applicants in view of Porambo et al. U.S. Patent 5,450,624 (hereinafter, "Porambo"), and further in view of Krochmal et al. U.S. Patent 6,870,934 (hereinafter, "Krochmal").

Regarding **claim 26**, Matsumoto in view of Porambo teaches the system of claim 21. However, Matsumoto in view of Porambo does not explicitly disclose in which the circuit comprises a signal measurement module.

Krochmal discloses a speaker detection system (col. 1, lines 64-6) in which may be contained in a separate power amplifier module (col. 2, lines 44-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Matsumoto in view of Porambo with the module taught by Krochmal to obtain the circuit comprises a signal measurement module as claimed for purpose of providing a further check that the proper speaker model has been installed in a particular vehicle, as suggested by Krochmal in column 1, line 67 – col. 2, line 2.

Regarding **claim 29**, Matsumoto in view of Porambo teaches a system 28. Matsumoto, as modified further teaches the system including a plurality of speakers (5, Fig. 3) wherein the amplifier (stereo unit 3, Fig. 3) having is a plurality of speaker outputs (col. 2, lines 60-65); detection every wiring state of every speaker (5; col. 4, lines 7-10); Porambo, as modified, further teaches a single channel in Fig. 3 including amplifier (34), speaker (80, Fig. 3; col. 5, lines 7-14).

However, Matsumoto in view of Porambo does not specify the system comprising: a second amplifier that is included in the apparatus, the first and second amplifiers each having one or more speaker outputs and being capable of being driven

independently, wherein the circuit is configured to sense an amount of power drawn at a power input of the apparatus while driving each amplifier independently, making it possible to diagnose output faults each output channel of each amplifier using the sensed power at the apparatus.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have amplifier making separable for purpose of being easily and correctly detected, as suggested by Matsumoto in column 1, line 20-32; see also In re Dulberg, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961).

Regarding **claim 33**, this claim merely specifies a program necessary for performing to method claim of claim 29 and is therefore interpreted and rejected for the same reasons.

Regarding **claim 34**, Matsumoto in view of Porambo teaches a system 21. Porambo, as modified, further teaches wherein:

the circuit generates the input signal at a selected frequency (a DSP generator would generate a generally inaudible tone, that is, a tone in a frequency range to which the human ear is less sensitive e.g. 19 KHz; col. 2, lines 52-57), and

the circuit determines the value indicative of the type of the speaker by:

computing an impedance at the speaker output when the speaker is operating at the selected frequency based on the sensed change in power (an acceptable or normal impedance range 90 as shown in FIG. 4; col. 5, lines 24-30),

*comparing the computed impedance to a set of stored values (*if the clipping threshold detected occurs at a level of signal 70 which is within a predetermined range corresponding to an acceptable or normal impedance range 90 as shown in FIG. 4, col. 5, lines 24-30) *and*

identifying a stored value corresponding to the measured impedance, the stored value identifying the type speaker (it will be understood that the conductors 76 and 78 form a complete circuit between the amplifier and the speaker terminals on speaker 80; if the microprocessor determines that the level of a signal 70 at the threshold of clipping is below the predetermined, normal range, a shorted connection across the speakers would be detected as indicated to the left of 90 in FIG. 4; similarly, if the level was higher than the predetermined range 90 when clipping threshold is detected, an open circuit connection would be identified across the conductor pair intended to couple each speaker with the amplifier 34, as illustrated to the right of 90 in FIG. 4; col. 5, lines 24-47; the acceptable range is dependent upon the variable impedance which may be presented by one or more speakers 80 (for example, the left front 16, left rear 18, right front 20 and right rear 22; see col. 5, lines 24-37), i.e., type of speaker depending on impedance).

Regarding **claim 35**, Matsumoto in view of Porambo teaches a system 34. Porambo, as modified, further teaches wherein: the stored value comprises an impedance of the identified type of speaker (the acceptable range is dependent upon the variable impedance which may be presented by one or more speakers 80 (for

example, the left front 16, left rear 18, right front 20 and right rear 22; see col. 5, lines 24-37), i.e., type of speaker depending on impedance) as measured when operating at the selected frequency (a DSP generator would generate a generally inaudible tone, that is, a tone in a frequency range to which the human ear is less sensitive e.g. 19 KHz; col. 2, lines 52-57).

Regarding **claim 36**, Matsumoto in view of Porambo teaches a system 34. Porambo, as modified, further teaches the system of claim 21 in which the circuit comprises a digital signal processor (28, Fig. 1) and a microprocessor (29, Fig. 1), software need be incorporated in the programmable memory of the DSP of a previously known radio assembly in order to implement the control and display of the status of each speaker connection to the DSP radio (i.e., a microcontroller, col. 6, lines 14-22).

Regarding **claim 37**, Matsumoto in view of Porambo teaches a system 34. Porambo, as modified, further teaches in which the circuit identifies the stored value based on the proximity of the measured impedance to the stored value (col. 5, lines 24-30).

8. **Claim 39** is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto U.S. Patent 4,752,959, cited by Applicants in view of Porambo et al. U.S. Patent 5,450,624 (hereinafter, "Porambo"), and further in view of Crooks U.S. Patent 4,638,258.

Regarding **claim 39**, Matsumoto in view of Porambo teaches the system of claim 21. However, Matsumoto in view of Porambo does not explicitly disclose in which the value indicative of which of the at least two speakers is connected comprises a signature impedance versus frequency curve.

Crooks discloses amplifiers which drive loads such as speakers (col. 1, lines 14-16) in which the curve shown in FIG. 11 is an impedance/frequency response curve given by a manufacturer for a typical speaker (col. 29., lines 26-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Matsumoto in view of Porambo with the amplifier taught by Crooks to obtain the value indicative of which of the at least two speakers is connected comprises a signature impedance versus frequency curve as claimed for purpose of providing the corrected transducer output can be a substantially perfect reproduction of the program, as suggested by Crooks in column 6, line 60-63.

Response to Arguments

9. Applicant's arguments with respect to claims 21-37 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CON P. TRAN whose telephone number is (571)272-7532. The examiner can normally be reached on M - F (08:30 AM - 05:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor VIVIAN C. CHIN can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/CPT/
March 18, 2009

/Vivian Chin/

Supervisory Patent Examiner, Art Unit 2614